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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,357	11/14/2003	Mahendra Pakala	2959P	3326

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EXAMINER

TRAN, MICHAEL THANH

ART UNIT	PAPER NUMBER
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2827

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/714,357

Applicant(s)

PAKALA ET AL.

Examiner

MICHAEL T. TRAN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 30-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2,8-10,13 and 30-40 is/are allowed.
- 6) ☒ Claim(s) 1,3-7,11,12 and 14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.


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DETAILED ACTION

1. In response to the Communications dated February 20, 2007, claims 1-14 and 30-40. are active in this application.

Claim Rejections- 35 U.S.C. § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(l) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

5. Claims 1, 3-7, 11 and 12 are rejected under 35 U.S.C 102(e) as being anticipated by Fukumoto et al. [U.S. Patent Application #20040145850].

With respect to claim 1, Fukumoto et al. disclose, in figure 1, a magnetic memory comprising: a plurality of magnetic elements [4, 8 or 10 within one element shown in figure 1], each of the plurality of magnetic elements being configured to be written using spin transfer [see "Description of the Related Art" section]; at least one stress-assist layer configured to exert at least one stress on at least one magnetic element of the

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plurality of magnetic elements during writing and not when the at least one magnetic element is in a quiescent state [see the "Summary of the Invention" section - in the cited section, Fukumoto et al. indicated that stress is induced]. It is noted that when an element is at rest, there's no potential acting on it, and therefore, there should not be any stress induced.

With respect to claim 3, Fukumoto et al. indicated, in figure 1, that the magnetic element includes a plurality of layers [1-10, for example] and wherein the at least one stress is in a direction perpendicular to a plane of at least one of the plurality of layers. See the "Description of the Preferred Embodiments" section.

With respect to claim 4, Fukumoto et al. indicated, in figure 1, that one of the layer is a free layer [10].

With respect to claim 5, Fukumoto et al. indicated, in figure 1, that the free layer includes a ferromagnetic layer [10] and a capping layer [any layer near the "free layer"], the free layer having a high positive magnetostriction [see the "Summary of the Invention" section].

With respect to claim 6, Fukumoto et al. indicated, in the "Description of the Related Art" section, that the free layer has a surface anisotropy and a total anisotropy perpendicular to a stable state of the free layer, the capping layer configured to modify the surface anisotropy to reduce the total perpendicular anisotropy and capable of including Cu, Au, Pd or Pt.

With respect to claim 7, Fukumoto et al. disclosed, in figure 1, that the at least one magnetic element includes at least one spin tunneling junction [8].

With respect to claim 11, Fukumoto et al. disclose, in figure 1, that the at least one magnetic element has a plurality of sides [all of them have six - planes] and wherein the at least one stress-assist layer surrounds the plurality of sides of the at least one magnetic element [see the "Summary of the Invention" section - in the cited section, Fukumoto et al. indicated that stress is induced].

With respect to claim 12, Fukumoto et al. further disclose a plurality of word write lines [wordlines]; and wherein the at least one stress-assist layer resides between the plurality of word lines and the at least one magnetic element. See the "Description of the Preferred Embodiments" section.

6. Claim 14 is rejected under 35 U.S.C 102(e) as being anticipated by Fukumoto et al. [U.S. Patent Application #20040145850].

With respect to claim 14, Fukumoto et al. disclose, in figure 1, a magnetic memory comprising: a plurality of magnetic elements [4, 8 or 10 within one element shown in figure 1], each of the plurality of magnetic elements being configured to be written using spin transfer [see "Description of the Related Art" section]; at least one stress-assist layer configured to exert at least one stress on at least one magnetic element of the plurality of magnetic elements during writing and not when the at least one magnetic element is in a quiescent state [see the "Summary of the Invention" section - in the cited section, Fukumoto et al. indicated that stress is induced], the stress-assist layer including at least one of a piezoelectric and an electrostrictive material [see the "Summary of the Invention" section].]. It is noted that when an

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element is at rest, there's no potential acting on it, and therefore, there should not be any stress induced.

Remarks

8. Applicant's arguments filed February 20, 2007 have been fully considered but they are not persuasive.

Applicant argued that the Fukumoto reference does not teach or suggest:

1. a spin transfer
2. writing to the magnetic element using a current
3. use of stress-assist layer[s] that are configured to exert stress[es] on magnetic element[s] during writing, but not when the magnetic element[s] are in quiescent state.

Contrary to Applicant's assertion of the above, the Examiner contends that the Fukumoto reference does teach and suggest all presently amended recitations. Fukumoto does teach a spin transfer [spin polarization – see paragraph 0007 of the "Description of the Related Art" section. Additionally, Fukumoto teach writing to the magnetic element using a current ["intensity of the current required for achieving the writing operation" – see paragraph 0157 of the "Description of the Preferred Embodiments" section]. Further, Fukumoto teach the use of stress-assist layers that are configured to exert stress[es] on magnetic elements[s] during writing [see figures 34 and 35], but not when the magnetic elements are quiescent [when the elements are at rest, there's no current running through them].

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for response to this final action is set to expire THREE MONTHS from the date of this action. In the event a first response is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event will the statutory period for response expire later than SIX MONTHS from the date of this final action.

Allowable Subject Matter

9. Claims 2, 8-10, 13 and 30-40 are allowable over the prior art of record.

10. The following is an Examiner's statement of reasons for the indication of allowable subject matter: the prior art of records does not show (in addition to the other elements in the claim) the following:

- the at least one stress induces at least one anisotropy on the at least one magnetic element during writing, the at least one anisotropy reducing a total anisotropy energy perpendicular to a stable state of the at least one magnetic element.
- The at least one magnetic element includes at least one spin valve.

- The at least one magnetic element includes at least one spin valve portion and at least one spin tunneling junction portion the at least one spin valve portion and the at least one spin tunneling junction portion sharing the free layer.
- Each of the plurality of magnetic elements further includes a first lead and a second lead for driving current through the magnetic element in a perpendicular-to-a plane direction to allow the magnetic element to be written using spin transfer.
- Each of the plurality of magnetic elements includes a free layer having a first ferromagnetic layer having a first magnetization, a second ferromagnetic layer having a second magnetization, and a separation layer between the first ferromagnetic layer and the second ferromagnetic layer, the separation layer configured to align the first magnetization and the second magnetization antiparallel.
- Each of the plurality of magnetic elements has at least one layer and being configured to be written using spin transfer of charge carriers polarized by at least one layer having an in-plane magnetization.
- Each of the plurality of magnetic elements further includes a ferromagnetic free layer and a nonmagnetic capping layer on the ferromagnetic free layer, the nonmagnetic capping layer reducing the perpendicular anisotropy of the ferromagnetic free layer.
- The at least one stress-assist layer being adjacent to a portion of each of the plurality of magnetic elements without residing above or below any of the plurality of magnetic elements.
- The plurality of magnetic elements includes at least one ferromagnetic layer, each of the at least one ferromagnetic layer having an in-plane magnetization.

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•a nonmagnetic capping layer on the ferromagnetic free layer, the nonmagnetic capping layer reducing the perpendicular anisotropy of the ferromagnetic free layer.

Conclusion

11. When responding to the Office action, Applicants are advised to provide the Examiner with line and page numbers of the application and/or references cited to assist the Examiner in the prosecution of this case.

12. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Michael T. Tran whose telephone number is (571) 272-1795. The Examiner can normally be reached on Monday-Thursday from 7:30-6:00 P.M.

13. Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (571) 272-1650.


Michael T. Tran
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April 7, 2007